

07 Fractions

DAILY PLANNING

The Priority Management Company of Pittsburg published, some years ago, some interesting study.

The result is that a normal citizen wastes almost a year of his life looking for things that he doesn't remember the place where he put them.

The first question is how many minutes a day is it?

A useful way to organize our time and consequently to become more organized is to have a daily schedule.

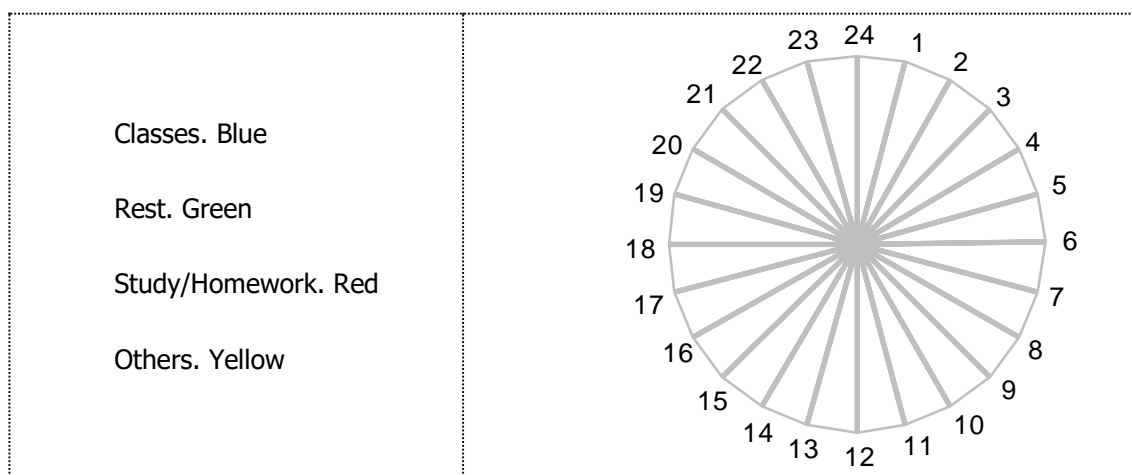
The way to do a planning is very simple. First of all we place on the schedule the routine actions for every day like rest, meals, classes,... After that we put the important things like study, homework, duties... and finally the less important like our hobbies...

PLANNING

	L	M	Mi	J	V	S	D
0-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							
10-11							
11-12							
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15-16							
16-17							
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18-19							
19-20							
20-21							
21-22							
22-23							
23-24							

How do you distribute your 24 hours a day?

Imagine the chart below is a 24 hour clock. Shade with different colours depending on the activity you do to the corresponding hour. Don't use half hours.



Now write as a fraction the part of the day you expend to each thing.

Activity	Fraction	Number of degrees
Classes. Blue		
Rest. Green		
Study/homework. Red		
Others. Yellow		
Total		

A circular sector is the area between two radii in a circle.



Sector circular

The graphics like this are called pie chart or circular chart.

1. FRACTION

What is a fraction?

A fraction is the ratio or quotient between two numbers.

For instance, $\frac{4}{5}$ -four fifths-.

This is the reason because this set of numbers is called ratio-nal numbers.

It is a way to compare two quantities: the numerator with the denominator.

For instance, I've got a €20 discount from €200 of expenses.

So the discount fraction is $\frac{20}{200}$ a 10%

The *top number* in a fraction is called the numerator and the *bottom number* is called the *denominator*.

Types of fractions

There are three types of fractions:

- A proper fraction has a smaller numerator than the denominator.

It represents a portion less than one: $\frac{1}{2}$

- An improper fraction has a numerator bigger than the denominator

So it represents a portion greater than one: $\frac{11}{3}$

- A mixed number is a way to represent the two parts of a quantity: the whole number part as well as the fraction part: $2\frac{1}{3}$

No integer values

Fractions have intermediate values between integer numbers.

For instance, $\frac{2}{3}$ is an intermediate value between 0 and 1. $0 < \frac{2}{3} < 1$

Fraction is a division

The value of $\frac{2}{5}$ is the same than 2 divided by 5.

So we can express the result of a division as a fraction.

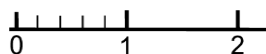
For instance, if I share 2 cakes into 5 people they will receive $\frac{2}{5}$ each one.

Representation in the number line

We represent the rational numbers in the number line dividing the unit into as many parts as the denominator and taking as many parts as the numerator.

For instance, complete this fragment of the number line and represent the fractions on it:

$\frac{3}{5}; \frac{-2}{5}; \frac{9}{5}; \frac{-10}{5}; \frac{14}{5}$



2. DECIMAL FORM FOR A FRACTION

It is possible to write a fraction as a decimal number.
We get it by dividing the numerator into the denominator.

For example, $\frac{8}{5} = 1'6$

In this way we can obtain three types of decimal expression:
An integer, if the remainder is zero.

For example, $\frac{15}{3} = 5$

A finite decimal part, if the number of decimals is limited.

For example, $\frac{7}{4} = 1'75$

A repeating decimal is a decimal number that has digits that repeat forever.

For example, $\frac{13}{11} = 1,18181818...$

Example:

Classify the following fractions according to their decimal part:

a) $\frac{7}{4}$

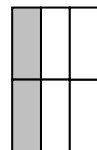
b) $\frac{10}{6}$

c) $\frac{13}{3}$

3. EQUIVALENT FRACTIONS

Two fractions are equivalent if they represent the same quantity.

For instance, $\frac{1}{3}$ and $\frac{2}{6}$.



Property

You get equivalent fractions by multiplying or dividing the numerator and denominator by the same number.

If you multiply then the result is an amplified fraction.

6/8 is an amplified fraction of 3/4

If you divide then the result is a simplified fraction.

In the opposite way 3/4 is a simplified fraction of 6/8

The fraction that you cannot simplify is named irreducible fraction.

All fractions could be reduced to an irreducible fraction.

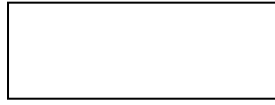
Example:

Obtain the irreducible fraction equivalent to $80/140$

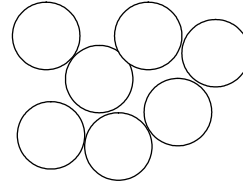
EXERCISES AND PROBLEMS

1. FRACTION

1. Represent $\frac{4}{5}$ of this rectangle.



2. Shade the right number of coins to demonstrate $\frac{3}{7}$



3. Put as a fraction three divided by seven.

4. Work out $\frac{3}{5}$ of 20 =

5. Work out $\frac{2}{3}$ of 24 =

6. Work out $\frac{4}{7}$ of 48 =

7. Work out $\frac{2}{3}$ of $\frac{4}{5}$

8. Represent $\frac{7}{3}$ on the number line.

9. Represent $-\frac{5}{4}$ on the number line.

10. Represent the following fractions on the number line: $\frac{-11}{3}$; $\frac{14}{5}$; $\frac{-13}{2}$ You can draw a line for each fraction:

11. Put in order lowest to highest these numbers and explain the method you followed:
 -3 ; $\frac{7}{3}$; $\frac{5}{2}$; 2

12. Convert to a mixed number $\frac{56}{9}$

13. Convert to a mixed number $\frac{38}{7}$

14. Convert to a mixed number $\frac{37}{5}$

15. Convert $\frac{11}{3}$ in a mixed number

16. Convert to a improper fraction $5\frac{3}{7}$

17. Convert these mixed numerals to improper fraction form
 1) $2\frac{2}{7}$ 2) $3\frac{3}{4}$ 3) $1\frac{7}{11}$ 4) $12\frac{6}{10}$

- 18.** Convert these fractions to mixed numeral form

1) $\frac{12}{5}$ 2) $\frac{16}{7}$ 3) $\frac{24}{8}$ 4) $\frac{56}{9}$

2. DECIMAL FORM FOR A FRACTION

- 19.** Calculate the decimal value of these fractions: a) $\frac{73}{5}$; b) $\frac{-13}{8}$; c) $\frac{0}{3}$; d) $\frac{-12}{3}$

- 20.** Calculate the decimal value of these fractions: a) $\frac{-23}{5}$; b) $\frac{53}{8}$; c) $\frac{0}{3}$; d) $\frac{18}{3}$

- 21.** Find the irreducible equivalent fraction to each decimal number: a) 0'24; b) -1'2; c) 0'42; d) -0'08

- 22.** Convert the following decimal numbers into irreducible fractions: a) 0'14; b) -2'2; c) 0'402; d) -0'06

- 23.** What is the decimal form of $\frac{-7}{3}$; b) Write 2,4 as a irreducible fraction.

3. EQUIVALENT FRACTIONS

- 24.** Find the missing value to get an equality between the two fractions: $\frac{3}{4} = \frac{\quad}{12}$

- 25.** Simplify $\frac{80}{140}$.

- 26.** Find the missing value to make the fractions equivalent

1) $\frac{2}{7} = \frac{\quad}{28}$ 2) $\frac{3}{5} = \frac{\quad}{25}$ 3) $\frac{4}{9} = \frac{\quad}{36}$ 4) $\frac{5}{6} = \frac{\quad}{66}$

- 27.** Simplify these fractions:

$\frac{4}{14}$ $\frac{25}{40}$ $\frac{12}{15}$ $\frac{18}{12}$ $\frac{68}{36}$

4. Problems

- 28.** This is a table that gathers the information about the effectiveness of four basketball players.
Order the players by their effectiveness.

Player	A	B	C	D
Throws	8	10	15	12
Field goals	5	8	9	6

- 29.** A family has €1000 of monthly incomes and they spend $\frac{3}{10}$ on food, $\frac{1}{5}$ on clothes, $\frac{1}{10}$ on leisure and $\frac{3}{4}$ on other expenses. How much do they save a year?

- 30.** A wire is 72 m long and it is cut into 2 pieces. One has five sixths of the length of the cable. How many meters does each piece measure?

- 31.** A fuel tank is 30000 litres of capacity. If the deposit is full and we use $\frac{3}{8}$ a day and $\frac{1}{6}$ of the remainder another day. How many litres do we have finally in the tank?